(19) Federal Republic of Germany

German Patent Office

(12) **Unexamined Patent Application**
(10) **DE 34 47 836 A 1**

(21) File Number: P 34 47 836.1
(22) Filing Date: December 12, 1984
(43) Date laid open: July 3, 1986

(51) Int. Cl.[6]:
H 02 G 9/04
E 01 B 2/00

(71) Applicant:
Stahlwerke Peine-Salzgitter AG, 3320 Salzgitter [Germany]

(72) Inventor:
Günter FASTERDING, 3152 Ilsede [Germany]; Jürgen FRENZEL, 3220 Freden [Germany]; Gerhard WEDEKIND, 3012 Langenhagen [Germany]

(54) Cable Through for Rail Systems

(57) A cable through for rail systems has U-shaped through elements that are covered by lids. The through elements and the lids are made of steel plate [TrN: steel sheet]. Furthermore, holding means are provided for the cantilevered support of the trough elements. Because of their low weight, the individual trough elements can be transported easily and compactly and are easy to install. Damages due to atmospheric influences are largely impossible.

LEINE & KÖNIG

PATENT ATTORNEYS

Sigurd Leine, Engineer (M.S.)
Dr. Norbert König, Physicist

Burckhardtstraße 1 Tel.: [illegible]
D-3000 Hannover 1
[Germany]

Our Ref. 168/7 Date December 18, 19

Rüterbau GmbH

C l a i m s

1. Cable through for rail systems, with U-shaped through elements that are upwardly open and covered by lids, characterized in that the through elements (1) and the lids are made of steel sheet profiles, that the through elements are connected at the ends and that means are provided to hold the through elements above the ground.

2. Cable through in accordance with Claim 1, characterized in that the means for holding the through elements (1) are spaced steel supports (3).

3. Cable through in accordance with Claim 2, characterized in that the supports (3) are arranged in the rail bed (7) or in the ground (4) next to [the rail bed].

4. Cable through in accordance with Claim 2, characterized in that the supports (3) have at their upper ends cross-members (2) which at least partially reach under the through elements (1) transversely to the longitudinal expansion of said through elements.

5. Cable through in accordance with claims 2 or 4, characterized in that supports (3) are arranged between adjacent through elements (1) at the respective interconnecting points (21).

6. Cable through in accordance with Claim 1, characterized in that the side walls of the through elements (1) preferably have vent holes (16).

7. Cable through in accordance with Claim 1, characterized in that the floor parts of the through elements (1) have water drain holes.

8. Cable through in accordance with Claim 1, characterized in that inserts (12) made of insulating material are arranged on the floor of the through elements (1).

9. Cable through in accordance with Claim 8, characterized in that the inserts (12) are U-shaped, with the branches of the U bearing against the side walls of the through (1).

10. Cable through in accordance with Claim 8, characterized in that the inserts (12) are made of synthetic fleece.

11. Cable through in accordance with Claim 1, characterized in that the lids (5) are developed in the shape of a U and the branches overlap the upper edges of the through elements (1).

12. Cable through in accordance with Claim 1, characterized in that the edges of the branches of the U-shaped through elements (1) are angled and form flanges (14, 15) located on a common plane.

13. Cable through in accordance with Claim 12, characterized in that the lid (5) and the flanges (14, 15) are screwed together or connected by friction clamps (6).

14. Cable through in accordance with claim 11 or 12, characterized in that the branches of the lids (5) reach beyond the ends of the branches of the through elements (1) to form a positive connection similar to that of a snap connection.

15. Cable through in accordance with Claim 1, characterized in that the through elements (1) are connected electrically to at least one rail (10).

16. Cable through in accordance with Claim 15, characterized in that respective groups (22, 23) of through elements (1) are interconnected electrically and each group, preferably with the associated supports (2, 3), is respectively connected electrically to at least one rail, preferably in the center.

17. Cable through in accordance with Claim 16, characterized in that expansion joints (26) are provided between the respective ends (27, 28) of adjacent groups (22, 23).

18. Cable through in accordance with Claim 17, characterized in that the expansion joints (26) are developed as insulating points.

19. Cable through in accordance with Claim 1, characterized in that two strands of through elements are arranged in

parallel side by side and covered by a shared lid (19) (Fig. 5).

20. Cable through in accordance with claim 17 or 18, characterized in that a support (29, 30) is provided for each of the ends (27, 28) of the trough elements (1) facing each other in an expansion joint (26) or at an insulation point.

LEINE & KÖNIG

PATENT ATTORNEYS

Sigurd Leine, Engineer (M.S.)
Dr. Norberg König, Physicist

Burckhardtstraße 1 Tel.: [illegible]
D-3000 Hannover 1
[Germany]

Our Ref. 168/7 Date December 18, 19

Rüterbau GmbH

Cable Through for Rail Systems

The invention relates to a cable through as described in the preamble of Claim 1.

A known cable through for railway systems has through elements and a lid made of concrete. The through elements are placed in the rail bed or on the ground very close to the rail bed, and thus not only are said through elements and the cables installed in said through elements subjected to the water in the ground and the frost that forms during freezing weather, but rather the through elements also form a water barrier which can lead to a water backup and thus to a washout and, in severe cases, even to a slippage of the embankment. The high weight of the individual through elements makes transporting them difficult. Furthermore, they require a large transport space. Installing them in the ground requires high installation costs.

The invention is based on the problem to provide a cable through arrangement for rail systems which does not have the disadvantages of the known through arrangements,

i.e., which is simple and inexpensive with respect to the development of the through elements, the transport and the installation, and furthermore, where there are no disadvantages due to atmospheric influences and finally, where there is no risk of water backup and washouts or slippage resulting therefrom.

The object of the invention is solved by the teachings listed in the characteristics of Claim 1.

The principal idea of the invention is to arrange the cable through system above the ground. This avoids the danger of damages due to atmospheric influences and washouts as a result of water backup. Furthermore, the unsupported arrangement does not pose an obstacle for the rail work and avoids damages due to movements in the rail bed or in the adjacent area of the ground. In this way, the individual through elements and lids can be developed with a lighter material, i.e., steel sheet. Another advantage is that the individual elements are very light and thus can be transported compactly and economically. The installation can be performed quite simply by first introducing the holding means for the through elements - generally simple supports - above ground, and the through elements are then fastened on said supports. Because of the low weight of the through elements, all of this can be done without the help of machines. It is even possible to span over other installations, such as cables laid into the ground or cavities or raises, because the cable throughs, due to their form, are very rigid and thus the supports can be spaced widely apart. The individual through elements can be connected with screw connections in that the through elements overlap partially, or even by using additional connecting steel sheets.

For a better connection and support of the through elements on the supports, it is useful to arrange respective cross-pieces on their upper ends, which reach under the through elements. The supports and in particular the cross-members also can be arranged primarily at the interconnection points between adjacent through elements, and the fastening of the supports then simultaneously effects the connection of the through elements.

In accordance with a further development of the invention, the side walls of the through elements preferably have air vents, which effects that the cables running inside the cable throughs are adequately cooled by passing air on hot summer days. It is furthermore useful if the through elements have drainage holes in the floor parts, which allows for the drainage of undesired water that has entered the throughs. Furthermore, it is useful to arrange inserts made of insulating material, such as synthetic fleece, for example, at the floor of the through elements. Said insert is usefully U-shaped, with the branches of the U bearing against the side walls of the throughs. The insert insulates the cables running through the cable through from the steel sheet of the through elements, thus effecting in particular thermal insulation as well.

The edges of the branches of the U-shaped through elements are usefully angled and form flanges situated on a common plane. Said flanges enforce the edges and also facilitate the fastening of the lids, for example by screwing or with friction bolts that are inserted through the holes in the lids and the lateral flanges and form a non-positive connection. It is also possible, though, for the branches of the lids to reach beyond the ends of the branches of the through elements to form a positive connection, similar to a snap connection, thus allowing not

only a simple fastening of the lids, but also a simple release.

Because the steel sheet cable through arrangement in accordance with the invention is electrically conductive, it is useful to ground it sufficiently with rail connections to prevent a voltage drop in electrical trains if the contact wire tears and falls on the cable through arrangement. In accordance with the invention, it is useful if respective groups of through elements are connected electrically, i.e., in particular short circuit-proof, and each respective group is preferably connected electrically in the center to at least one rail. In this way, the grounding effort can be kept relatively low.

To absorb thermal expansions, it is useful to provide expansion joints between the individual through elements, but in particular between the ends of adjacent groups of interconnected through elements. Said expansion joints can be simultaneously developed as insulating points to ensure a completely separate grounding of the individual and interconnected through elements, which is useful with respect to the conventional rail clearing systems. It goes without saying that the expansion joints and/or insulating points require a mechanical connection of the opposing ends of the through elements. In the simplest manner, this can be effected with insulating elements that are screwed to the ends. However, it is also possible, to provide a separate support for each end situated in the area of an expansion joint and/or insulating point.

The invention is explained in greater detail by means of an embodiment and the drawings.

Fig. 1 shows schematically the section through a

cable through arrangement according to an embodiment of the invention in connection with a rail system,

Fig. 2 shows, in enlargement, the upper portion of the cable through arrangement according to Fig. 1

Fig. 3 shows a lateral view of Fig. 2,

Fig. 4 corresponds essentially to Fig. 2 and shows a modification of the cross-section of the cable through arrangement,

Fig. 5 shows a cable through arrangement, similar to Fig. 2, but with two cable throughs being placed side-by-side,

and

Fig. 6 emphasizes the grounding of the cable through arrangement.

Fig. 1 shows a section of a cable through arrangement where the through elements 1 are held via cross-members 2 by means of supports 3 in the ground 4. The through elements 1 are covered by the lids 5, which are held by means of friction pins 6. The supports 3 are located adjacent to a rail bed 7, where cross-ties 8 and rails 9 and 10 have been placed. The through elements 1 are connected to the rail 10 by grounding cables 11.

Fig. 2 shows an enlargement of the cross-section of the cable through arrangement according to Fig. 1, with the lower part of the supports 3 being cut away. The U-shaped development of the through elements 1 is clearly visible. Inside said through elements is a U-shaped insert 12 of synthetic fleece on which the cables 13 rest. The upper edges of the branches of the U-shaped through elements 1 are angled outward and form the flanges 14 and 15, on which the lid 5 rests and is held by the friction pins 6, which

project through corresponding holes in the lid 5 and the flanges 14 and 15 and are held non-positively. The supports 3 and the cross-members 2 consist of angle sections, but they may have any other suitable profile as well.

Fig. 3 shows a lateral view of Fig. 2, thus rendering visible the air vents 16 for facilitating a cooling of the cables 13 arranged inside by the passing air on hot summer days.

Fig. 4 essentially corresponds to Fig. 2; identical parts have identical reference symbols. With the exception of the rectangular rather than trapeze-shaped development form of the U-shaped cross-section of the through elements 1, in said embodiment the upper edge of the branches of the U-shaped through elements 1 is angled inwardly to form the flanges 17 and 18. This results in a narrower width of the overall diameter.

Fig. 5 essentially corresponds to Fig. 2 and merely shows the parallel placement of two through elements 1 side by side. Again, identical parts are labeled with identical reference symbols. In the center area, however, the flanges 14 and 15 overlap and thus form an interconnection. Furthermore, a lid 19 covers both strands of cable throughs 1. A cross-member 20 simultaneously holds both through strands.

Fig. 6 shows a short circuit-proof connection of several through elements 1 at butt joints 21 forming through element groups 22 and 23, which are respectively grounded individually by grounding wires 24 and 25. Also at the butt joints 21 are the supports 3, which at the same time facilitate a short circuit-proof connection of the ends of the adjacent through elements 1.

An expansion joint 26 formed between the two groups 22 and 23 allows for thermal expansion and simultaneously

represents an insulating point between the groups 22 and 23. The ends 27 and 28 facing each other in the area of the expansion joints 26 are held respectively individually by the supports 29 and 30.

1 empty page

RUTH BOGGS, M.A.
ATA-Certified Translator
German-English, English-German

4111 Port Rae Lane • Fairfax, Virginia 22033 • Tel. (703) 378-9305 • FAX (703) 378-1624

CERTIFICATION

This is to certify that

(1) I am a German into English and English into German translator, certified by the American Translators Association;

(2) I have translated the following document(s):

EPO Correspondence re.: Opposition EP 1284128

from German to English.

(3) The attached English translation is a true and correct translation of the German source document(s) to the best of my knowledge and belief.

Date: May 21, 2007

Ruth Boggs, M.A.